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interchanged in their alphabetical position and where the vowel and consonant frequency tables are useless. Under this type the most interesting point was the construction of a military message by the method of the famous Playfair Cipher of the British army.

"A Generalization of the Mean Value Theorem." H. H. Downing, University of Ky.

The conditions of $0 < \theta < 1$ and $0 < h$ were removed and several functions were examined to find a relation between θ and h. For the function $ax^3 + bx^2 + cx + d$ we set $\varphi = \theta h$ and substitute the function in

$$\frac{f(x+h) - f(x)}{h} = f'(x + \varphi),$$

and obtain the equation

$$ah^2 - 3a\varphi^2 + (3ax + b)h - 2(3ax + b)\varphi = 0.$$

This is seen to be an ordinary hyperbola with transverse axis vertical and the hyperbola passing through the origin. (φ-axis vertical, H-axis horizontal.) The straight lines $\varphi = 0$, $\varphi = 1/3\ h$, $\varphi = 2/3\ h$, $\varphi = h$, $\varphi = 4/3\ h$, are the loci, respectively, of a focus, vertex, center, vertex and focus.

Prof. E. L. Rees was elected chairman for the year 1918–1919 and the present secretary was reëlected. The secretary's report was then given. Regret was expressed at the absence of Prof. W. H. Garnett, Wesleyan College, Winchester, Ky., and Prof. Henry Lloyd, Transylvania College, Lexington, Ky., both caused by illness. Regret was also expressed that Prof. H. R. Phalen was leaving the state.

Those present during the meetings were: A. L. Rhoton, David W. Martin, Georgetown College; G. C. Crooks, Center College; H. R. Phalen, Berea College, J. M. Maxey, Asbury College; P. P. Boyd, J. M. Davis, E. L. Rees, V. G. Grove, H. H. Downing, University of Kentucky.

H. H. Downing, *Secretary.*

BOOK NOTICES.

Send all communications about books to W. H. Bussey, University of Minnesota.

The number of books in the English language on the theory of functions of a complex variable continues to grow. One of the latest is "Functions of a Complex Variable," by Thomas M. Macrobert, Lecturer in Mathematics in the University of Glasgow. It is published by Macmillan and Co., London. The book is designed for beginners who have acquired a good working knowledge of the calculus. In order to make the subject not too difficult for beginners, the author has abstained from the use of strictly arithmetical methods and, while endeavoring to make his proofs sufficiently rigorous, he has based them mainly on geometrical conceptions.

"Has mathematics a ealm apart from human life, fitting daily experiences in places closely enough to be of use, but still not at all identical with it; or is it, indeed, the very same as the realm of human life? Is the differential equation only a refinement upon the real law of physics, the irrational only an approximation to the actual number of nature? Is the universe stable or will it some day disappear, wind its way back into chaos, leaving nothing but the truths of mathematics still standing? Is it true that chance does not exist really but only in seeming, or is everything purely chance, and are the laws of the universe merely the curves which we have drawn through a random few of an infinitely compact set of points? The consideration of these problems is what we mean by the philosophy of mathematics." A new book on this subject has recently been published by the Open Court Publishing Company, 122 South Michigan Ave., Chicago, Illinois. It is entitled "Lectures on the Philosophy of Mathematics" and is by James Byrnie Shaw of the Department of Mathematics of the University of Illinois.

The number of trigonometry text books on the market is so very large that the author of every new one feels called upon to explain in his preface just why he has added to the list. The preface to the new "Plane and spherical trigonometry" by Professor Leonard M. Passano of the Massachusetts Institute of Technology says that the chief aim of the text are brevity, clarity and simplicity. The text "aims to present the trigonometry in such a way as to make it interesting to students approaching some maturity, and so as to connect the subject, not only with the mathematics which the student has already had, but also with the mathematics which, in many cases at least, is to follow." The book aims to avoid the tendency to amplification which the author says trigonometry texts of late years have shown. The book is published by the Macmillan Company.

One of the most interesting chapters in the first course in calculus is the chapter on maxima and minima. The many practical problems that can be solved by the simple criteria given in the ordinary calculus text book interest the student exceedingly. They make him feel that the calculus has power. Mathematicians have always been interested in problems of maxima and minima. Those of the present day who are especially interested in the subject and who want a somewhat full treatment rather than the brief inadequate treatment given in the current text books will welcome the 193-page book on "The Theory of Maxima and Minima," by Professor Harris Hancock, of the University of Cincinnati, published by Ginn and Company.

PROBLEMS FOR SOLUTION.

SEND ALL COMMUNICATIONS ABOUT PROBLEMS TO B. F. FINKEL, Springfield, Mo.

2719. Proposed by R. P. BAKER, University of Iowa.

Show that, $2x(\log x)^2 - x(x-1)(x+3)\log x + (x-1)^2(3x-1)$ is negative for $1 < x < \infty$.

2720. Proposed by CAPT. A. A. BENNETT, C.A.R.C., Galveston, Texas.

Given three points, A, B, C, in a plane, draw from an arbitrary fourth point D the segments AD, BD, CD. Also draw rays AA', BB', CC', making equal (small) angles respectively with